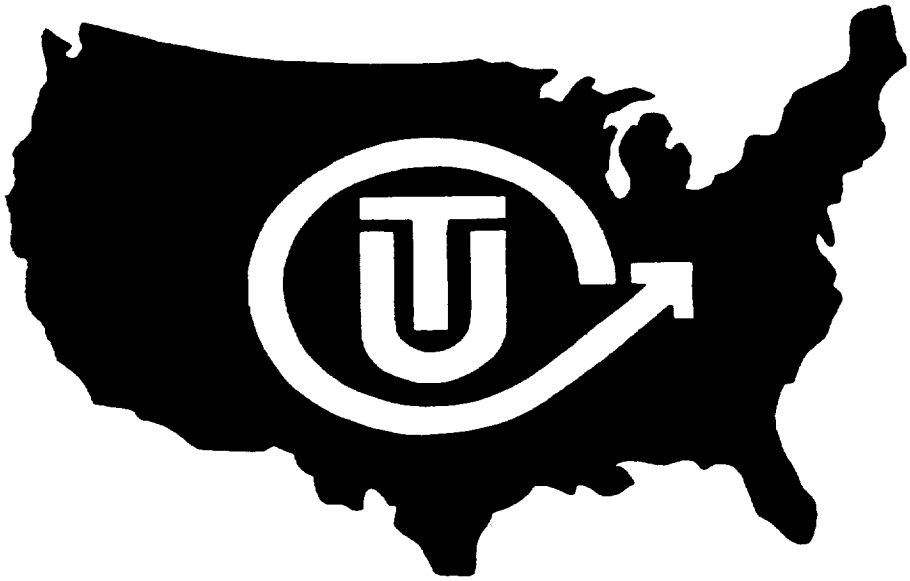
NASA-CR-195718

NASA
National Aeronautics and Space Administration

TUNS User Guide Supplement



Introduction to PCs

N94-72051

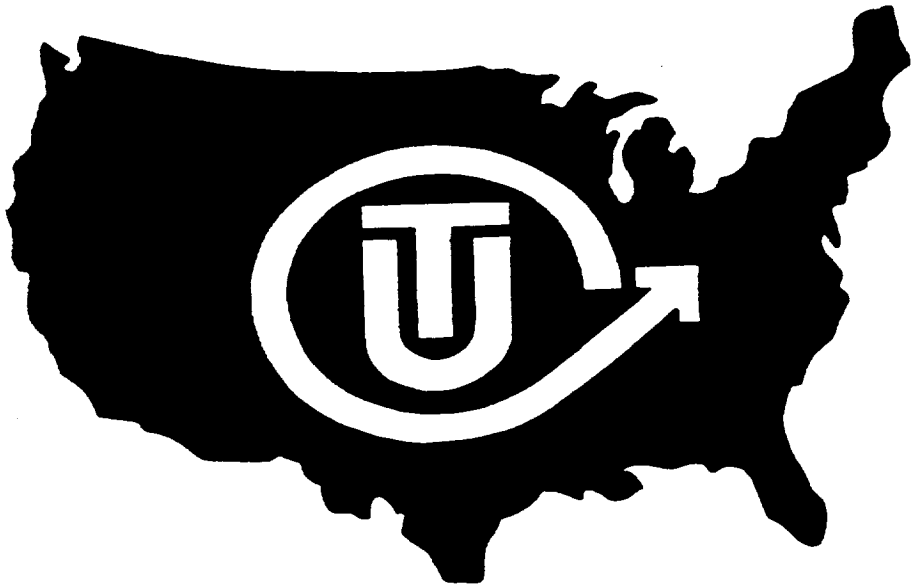
Unclas

Z9/61 0012071

(NASA-CR-195718) TUNS USER GUIDE SUPPLEMENT: INTRODUCTION TO PCs (Information Systems and Networks Corp.) 38 p

NASA
National Aeronautics and
Space Administration

TUNS User Guide Supplement



Introduction to PCs

TUNS USER GUIDE

NASA CONTRACT NUMBER: NASW-4164

INFORMATION SYSTEMS AND NETWORKS CORPORATION (ISN)
10411 MOTOR CITY DRIVE
BETHESDA, MARYLAND 20817

JULY 1988

TABLE OF CONTENTS

PAGE

INTRODUCTION TO PCs 1-1

Overview 1-1
Hardware 1-2
Monitor or CRT 1-3
PC Keyboard 1-4
Central Processing Unit (CPU) 1-8
Disk Drives 1-9
Hard Disks 1-10
Floppy Diskettes 1-11
General Rules To Keep In Mind 1-12
Optional Hardware 1-14
Printers 1-15
Modems 1-17
Tape Backup Unit 1-18
Hardware Configurations 1-19
Software 1-21
DOS 1-23
DOS Commands: Directory 1-28
DOS Commands: Copy 1-31

LIST OF FIGURES

FIGURE		PAGE
2-1	Minimum PC Configuration	2-2
2-2	Two Common Computer Keyboards	2-4
2-3	Common PC Keyboard Groups	2-7
2-4	Flow of Information Through the CPU	2-8
2-5	Common Arrangement of IBM Disk Drives	2-9
2-6	Arrangement of IBM Disk Drives With Two Floppies	2-10
2-7	Internal Elements of a Floppy Diskette	2-11
2-8	How to Handle Your Floppy Diskettes	2-12
2-9	Location of the Write Protect Notch on a Floppy Diskette	2-13
2-10	Microcomputer System	2-14
2-11	Sample Printed Outputs From Various Types of Printers	2-16
2-12	Typical PC Modem Linkage	2-17
2-13	Common Tape Backup Unit	2-18
2-14	Stand Alone PC	2-20
2-15	Typical LAN Configuration for TUNS	2-20

INTRODUCTION TO PCs

OVERVIEW

This section provides an introduction to personal computers (PCs) for the first-time user. The basic components of both hardware and software are covered, and diagrams and examples have been included whenever appropriate. Figure 2-1, Minimum PC Configuration, shows a basic, typical personal computer.

Hardware components are covered first. They include:

1. Monitor or CRT
2. Keyboard
3. Central Processing Unit (CPU)
4. Disk Drives
5. Disks

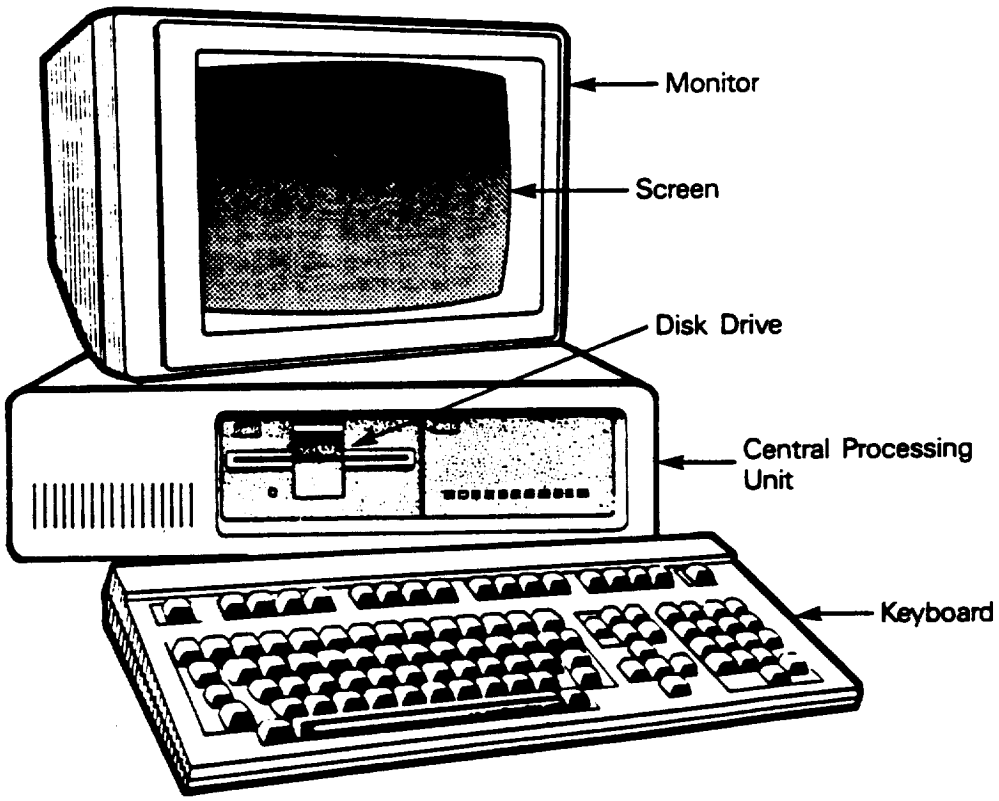
A discussion of software concepts follows including a detailed explanation of the differences between an operating system and an application program.

HARDWARE

In computer terms hardware refers to any part of the PC that can be physically touched. Different computer systems are configured with different hardware pieces but all PCs at minimum, have at least the following:

1. Monitor or CRT
2. Keyboard
3. Central Processing Unit (CPU)
4. Disk Drives
5. Disks (See Figure 2-7)

Figure 2-1. MINIMUM PC CONFIGURATION



MONITOR or CRT

The CRT (also referred to as a monitor or terminal) is like a small television screen that displays the information being processed. It allows you to read the commands you issue to the computer and the replies the computer issues to you.

CRT stands for Cathode Ray Tube, which is the electronic device responsible for turning keyboard input into a readable image on a screen. The word "screen" is used to indicate the words and/or data that are displayed on the CRT's screen (see Figure 2-1) at any one time. Just like a page of text in a book, a CRT can only display a certain amount of information on a screen at anyone time.

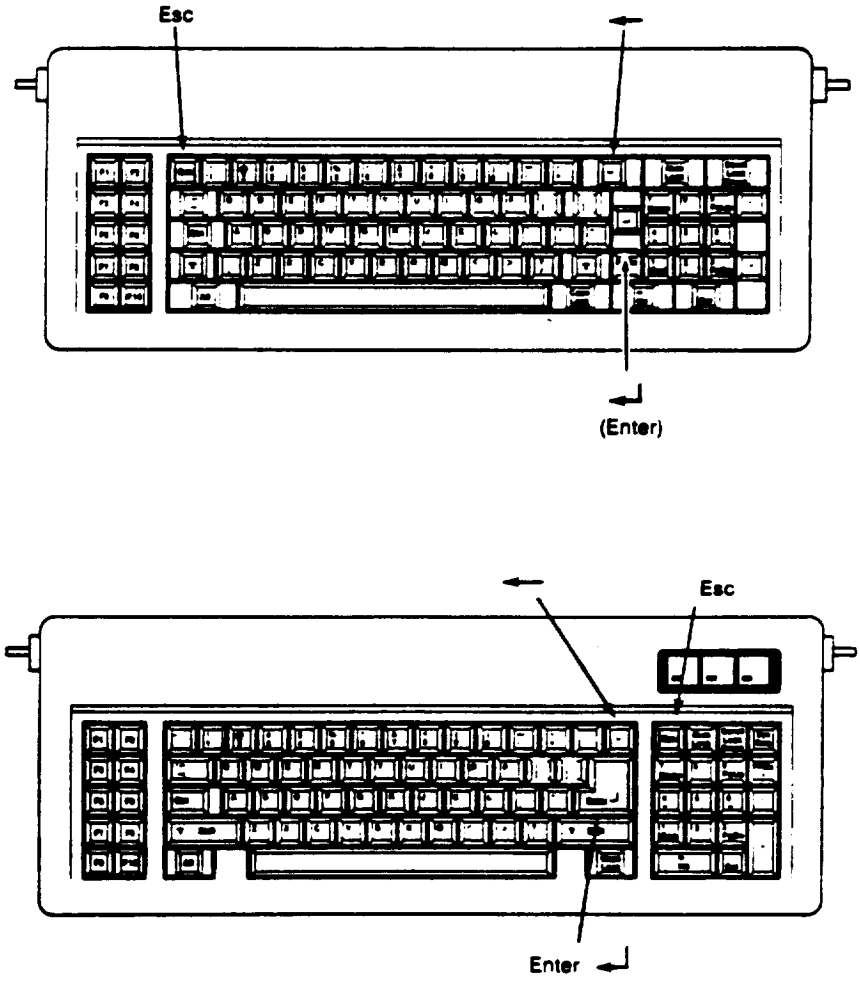
When the CRT is on, it will display a cursor. The cursor is a small blinking dash that indicates where the computer expects the next character to be entered. As text is entered, the cursor will progress across the screen.

NOTE: **Most CRTs have an on/off switch which functions independently of the computer. If your computer is on, and you are not getting an image on your screen, make sure the monitor is turned on. Additionally, the CRT has a brightness and dimmer knob that allows you to increase or decrease the brillance of the screen. If you are leaving your CRT for longer than 30 minutes, it is a good idea to either turn the brightness all the way down or turn the monitor off. This will prevent the image on the screen from burning in.**

PC KEYBOARD

Information is entered into the computer by pressing the keys on the keyboard. The computer keyboard is very similar to a typewriter keyboard, but it contains more keys.

Figure 2-2. TWO COMMON COMPUTER KEYBOARDS.



Most PC KEYBOARDS have four groups of keys: See Figure 2-3 for an example of the four keyboard groups.

1. STANDARD TYPEWRITER KEYS: These are the alpha and numeric keys located in the center of the keyboard. As the name suggests these keys are identical to the keys found on a typewriter. There are some small but important differences. The most important difference is the carriage return or enter key. This key is used to enter information into the computer. For instance, when you have typed a line of information on the monitor, generally you will press the enter or carraige return key. This key can, therefore, be thought of as an execution key. The normal typing function of the carriage return key is usually not necessary with computers because the computer automatically returns to the next line when you have reached the right margin. However, in some applications, the return key will function as a normal carraige return key.

2. FUNCTION KEYS: These keys are usually grouped to the left of the standard typewriter keys or across the top of the keyboard. They are labeled F1-F10 or F-12. These keys can be thought of as wildcards, because they perform so many different functions. The determining factor on what they will do depends on what application program you are running. For instance, if you are typing a letter using a word processing program, pressing key F1 may cause your letter to print out on a printer. However, if you are doing calculations using a spreadsheet program, pressing key F1 may cause the spreadsheet to increase in size. Some programs will come with an instruction template, explaining what the function keys will do in specific programs, to eliminate keyboard memorization.

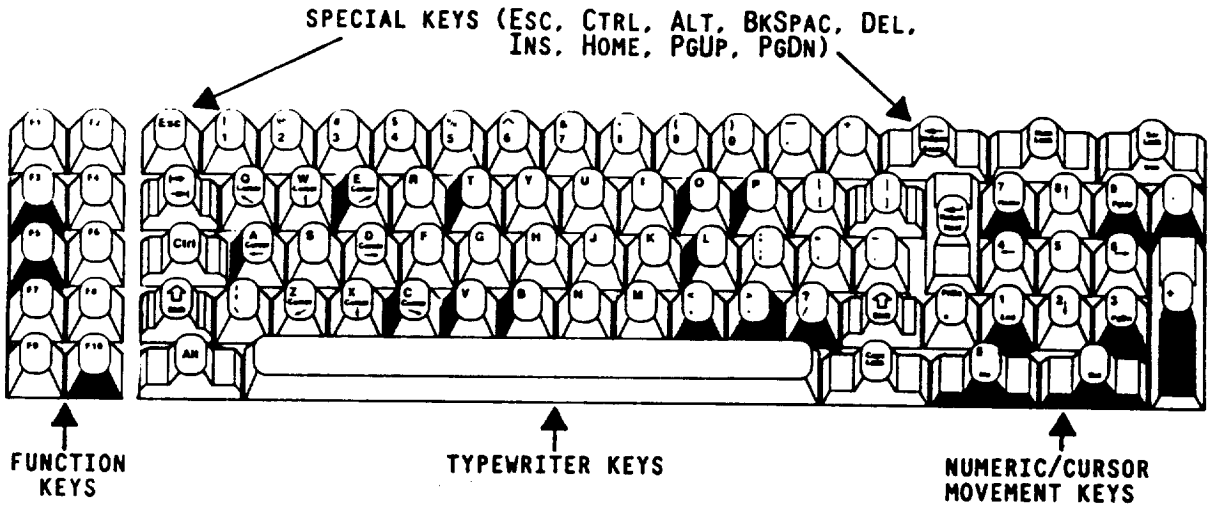
3. NUMERIC/CURSOR MOVEMENT KEYS: The numeric/cursor movement keys are usually to the right of the standard typewriter pad. This keypad primarily consists of standard number keys and cursor movement keys. The number keys on this pad are used the same as the numbers across the top of the standard typewriter pad; the computer cannot tell the difference between the two. The calculation features on this pad (+,-,x, etc.) work just like those on a calculator (note: You must first be in a program that allows calculations).

   There are some keys, depending on the software being used, that will work in the following way: The special movement keys will move the cursor through screens and documents. The following are movement keys: the directional arrow keys, Home, PgUp, PgDn, and End. The directional arrow keys move the cursor one character at a time in the direction the arrow points. The Home key will place the cursor at the top of a document. The End key will place the cursor at the end of a document. The PgUp key will move the cursor to the previous screen. The PgDn key will move the cursor to the next screen.

4. SPECIAL KEYS: At various locations on the keyboard there are several special keys. They are Ctrl, Alt, Esc, Del, and Backspace. All of these keys except Del and Backspace, resemble function keys and perform different functions in different programs. Special keys differ from other keys in that they usually must be pressed in combination with other keys in order to work. For instance, generally, if you press Ctrl, Alt, and Del at the same time, you will re-start the computer. The Del (Delete) key erases the character that is directly over the cursor. The Backspace key erases the character directly to the left and backspaces at the same time.

NOTE: The letter "o" and the number "0" are not interchangeable. The computer knows the difference between the two. Make sure to use "o" for letters and "0" for numbers.

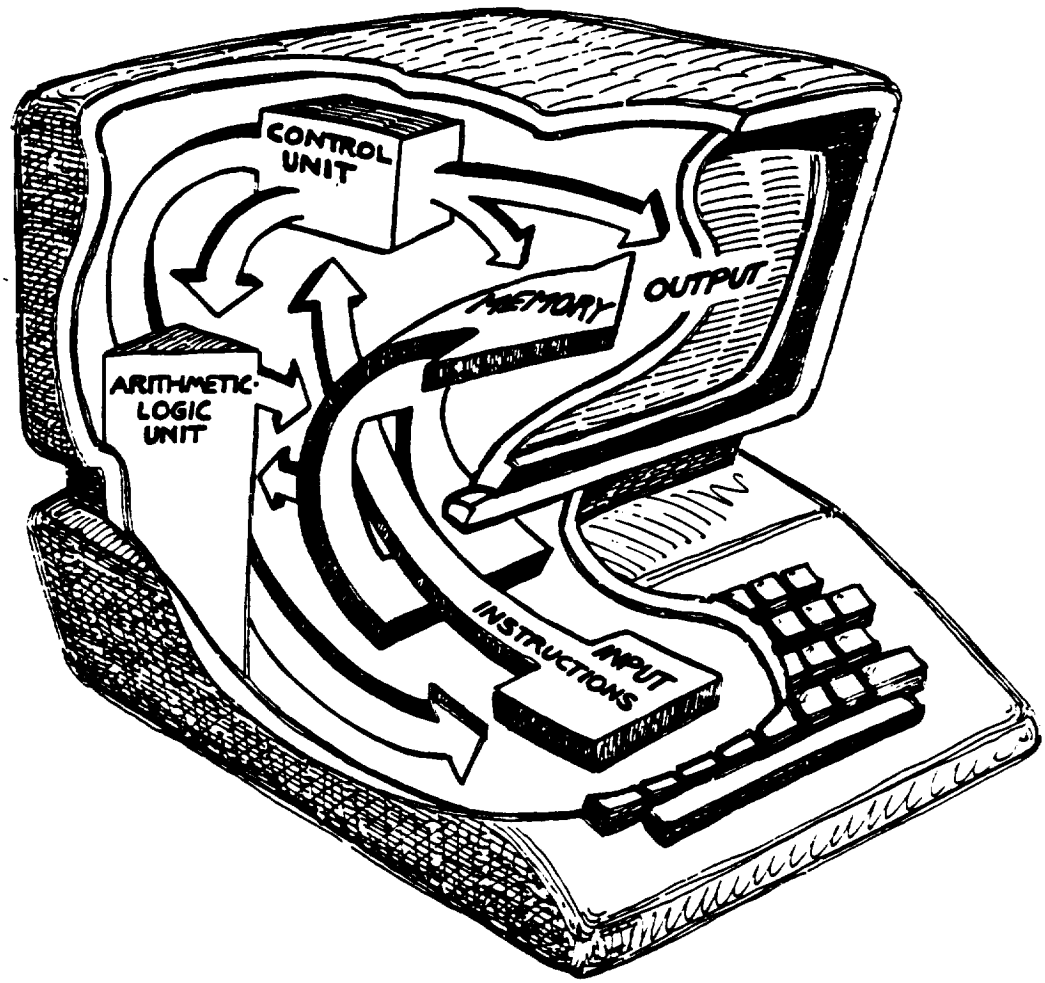
Figure 2-3. COMMON PC KEYBOARD GROUPS.



CENTRAL PROCESSING UNIT (CPU)

The central processing unit is commonly referred to as the CPU. The CPU is the brain of the computer; the part of the system that does the actual work. In personal computers (PCs) the CPU is a tiny silicon chip that consists of thousands of electronic circuits. Once the instructions have been issued, the CPU controls the computer's sequence of actions, does calculations, and contains a memory facility that temporarily stores information. The CPU controls the flow of information into and out of the system. It also interprets a program, performs each of the programs steps, and then sends the results to the user. Figure 2-4 presents a pictoral work flow of a typical CPU.

Figure 2-4. FLOW OF INFORMATION THROUGH THE CPU.



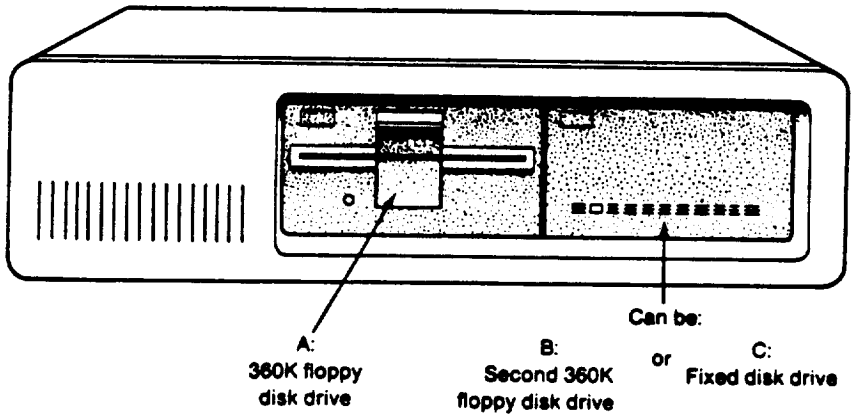
DISK DRIVES

There are two types of disk drives as shown in Figure 2-5: a hard disk (fixed) and a floppy disk. (Most business oriented PCs use a combination of both). Disk drives record and retrieve data from storage. In computer language this is called "reading" and "writing." When the disk drive retrieves data from storage, it is "reading" the information into the CPU's temporary memory. When it stores information, it is "writing" the information from the CPU's memory onto a storage medium.

Both disk drives have a light which indicates when they are in use. The floppy disk drive has an external door latch which allows you to exchange floppy diskettes. The hard disk drive is permanently lodged inside the computer near the CPU. Unlike the floppy disk drive, it is inaccessible to the PC operator.

NOTE: **There are two ways to refer to a disk drive. You can call a disk drive by its name, hard (fixed) or floppy. Or you can call a disk drive by its address. An address is where the computer understands one of its devices to be located. In the case of disk drives, floppy disk drives are always given the address of "A" and/or "B". In a case where the PC has two disk drives, the top disk drive or the left most disk drive will always be the "A" drive. The other floppy disk drive will be the "B" drive. The hard (fixed) disk drive is always refered to as the "C" drive.**

Figure 2-5. COMMON ARRANGEMENT OF IBM DISK DRIVES.

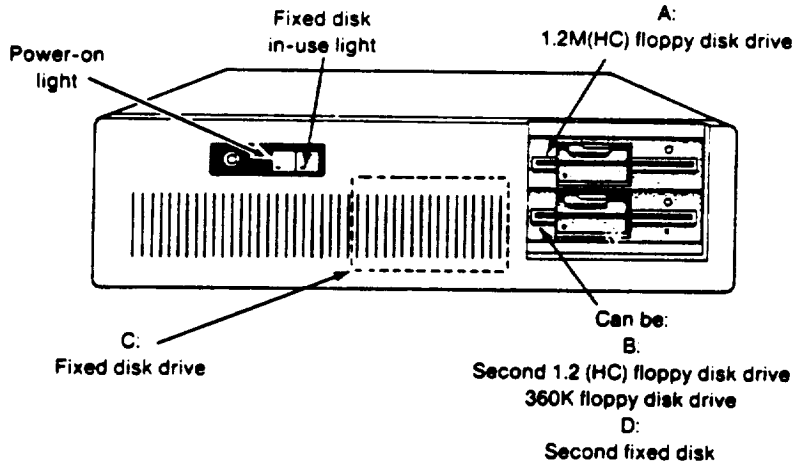


HARD DISKS

Hard (fixed) disks are magnetic devices used by the PC to store data. Like record albums they have grooves for recording and replaying information. Each hard disk has a platter coated with a thin film of magnetic oxide designed to store anywhere from 10 to 100+ megabytes of information. Typically a standard IBM type PC will come with a 20 to 40 megabyte hard disk. One megabyte is approximately equivalent to 750 pages of information. Therefore, a 20 megabyte hard disk can store approximately 15,000 pages of information.

The hard disk drive stores information on hard disk. The hard disk is lodged in the hard disk drive. The hard disk, like the hard disk drive, is physically inaccessible to the PC operator. Generally, the hard disk will store all the software (instructions) the CPU needs in order to run and the day to day files you create. See Figure 2-6.

Figure 2-6. ARRANGEMENT OF IBM DISK DRIVES WITH TWO FLOPPIES.

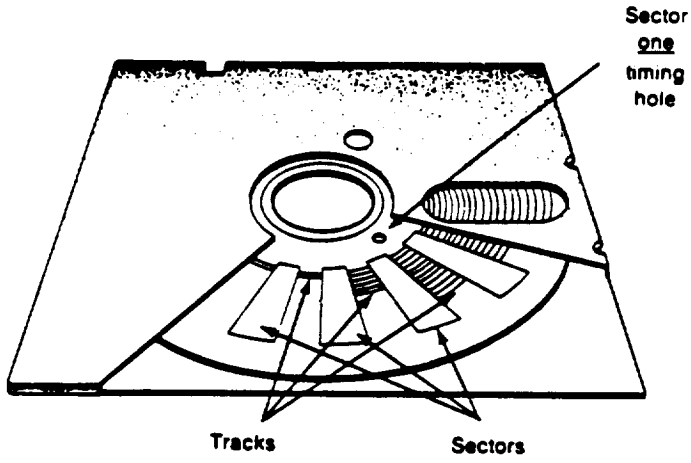


FLOPPY DISKETTES

Floppy diskettes (also known as "floppies") are small transportable versions of hard disks (see Figure 2-7). They work exactly like a hard disk, only they store far less data and can be removed from the PC. A double density 5 1/4" floppy diskette, the standard for IBM type PCs, can store approximately 250 pages of information. Therefore, it would take approximately 60 floppy diskettes to store the same information as one 20 megabyte hard disk. Floppy diskettes are inserted and removed from the floppy disk drive's external door. Diskettes are generally used for the following reasons:

1. Removing data from the hard disk when the hard disk gets too full.
2. Transporting information from one computer to another.
3. Keeping information private.
4. Loading software onto the PC for the first time.

Figure 2-7. INTERNAL ELEMENTS OF A FLOPPY DISKETTE.

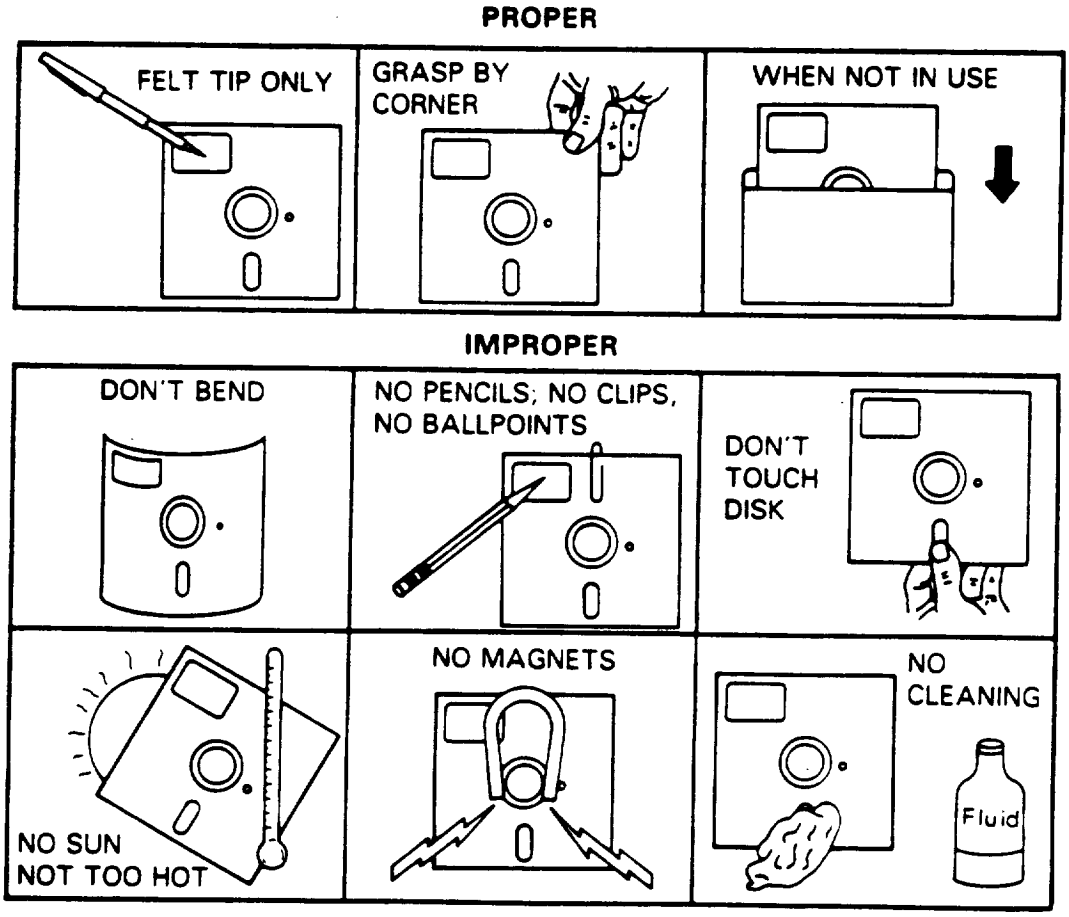


GENERAL RULES TO KEEP IN MIND

Diskettes can be easily damaged resulting in the loss of information stored on them. The following rules should be followed for maximum protection:

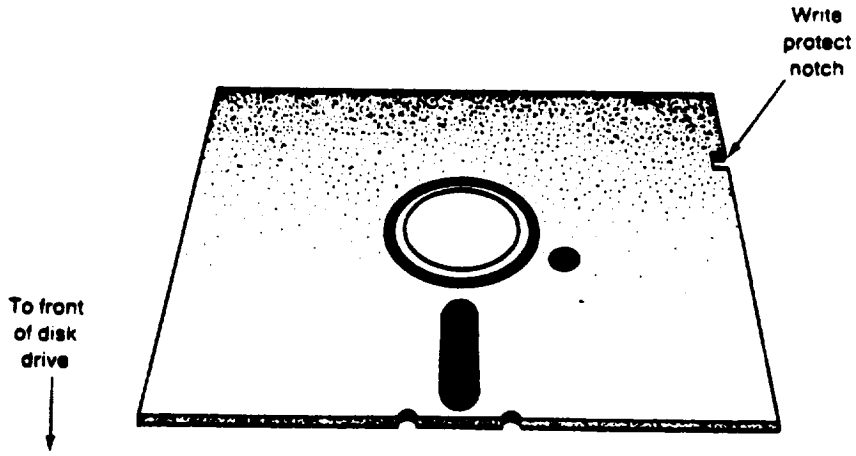
1. Never touch the inner exposed part of the diskette.
2. Do not write directly on the diskette.
3. Place the diskette in the diskette jacket before putting it way.
4. Keep the diskette free of extreme temperatures.
5. Keep the diskette away from magnetic fields. (Most small motors, e.g., air conditioners, typewriters, fans, and copiers create a magnetic field.)

Figure 2-8. HOW TO HANDLE YOUR FLOPPY DISKETTES.



Floppy diskettes are designed for repeated use. But if they are left unprotected, they can be recorded over. If this occurs, all the original information on them will be lost. To prevent loss of information, diskettes come with a write protect notch. When a tab is placed over the write protect notch, the PC will not allow the diskette to be recorded over. ALL VALUABLE DISKETTES SHOULD BE WRITE PROTECTED!!

Figure 2-9. LOCATION OF THE WRITE PROTECT NOTCH ON A FLOPPY DISKETTE.



OPTIONAL HARDWARE

The hardware described in the previous sections is the minimum amount of equipment a PC must have in order to operate. Optional hardware covers the hardware components that are not necessary to PC operation. Instead these components will enhance the TUNS PC capabilities:

1. Printer
2. Modem
3. Tape Backup Unit

Figure 2-10. MICROCOMPUTER SYSTEM (CLOCKWISE FROM BOTTOM): LIGHT PEN; CASSETTE PLAYER; DISK DRIVE; PRINTER; MONITOR; MODEM; MOUSE; GRAPHICS TABLET; AND KEYBOARD/CPU (CENTER).

PRINTERS

The printer is an output device for producing paper copies (also called hard copies) of the work you create using the PC. Typically, you will instruct the computer to find a particular document that you have created and ask it to print out this information. There are a number of different types of printers that produce different quality results:

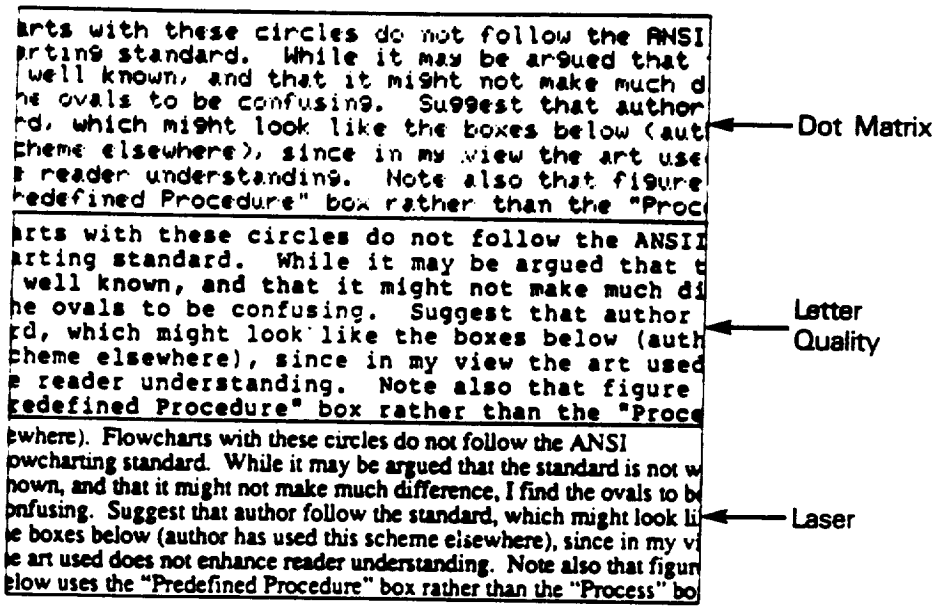
- **DOT MATRIX PRINTER:** This type of printer is perhaps the most common. It produces characters on paper by printing dots. Its print head has a set of closely spaced wires or pins that produces dots in a pattern that become a letter, number, or part of a picture.

- **LETTER QUALITY PRINTER:** This type of printer produces better quality documents than the dot matrix. Its print head is like that of a typewriter: it actually contains all the possible characters and produces an image by striking an inked ribbon against the paper. This type of printer is usually necessary to produce professional looking documents.

- **LASER PRINTER:** Currently, this type of printer is considered the top of the line. It uses heat and chemicals to place characters on paper. A laser traces out the characters. A chemical powder is then sprayed on the paper. The chemical only sticks to the areas heated by the laser. The rest of the powder falls off.

The following figure, Figure 2-11, presents examples of different printer outputs.

Figure 2-11. SAMPLE PRINTED OUTPUTS FROM DOT MATRIX (TOP), LETTER QUALITY (MIDDLE), AND LASER PRINTERS.

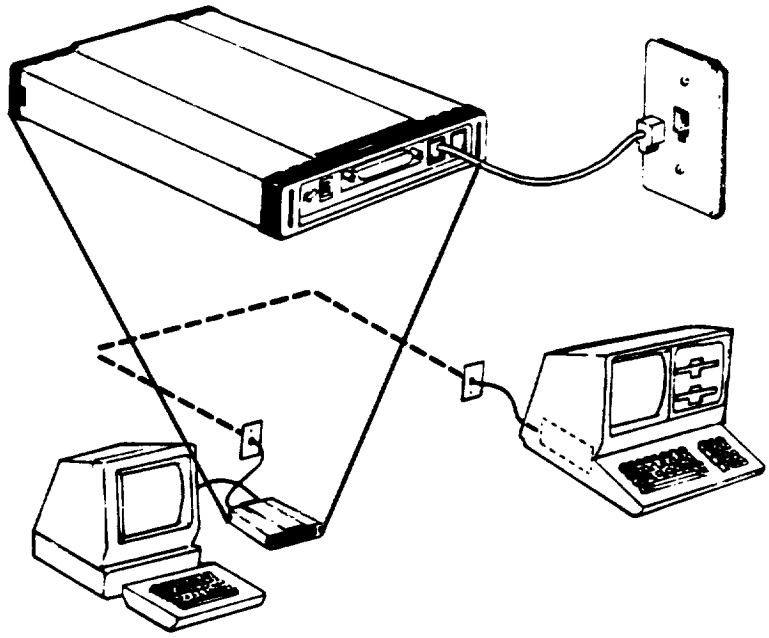


MODEMS

A modem is a telecommunications device that links PCs via telephone lines and makes it possible for PCs to communicate with each other without being directly hard wired. The modem may be either internal (a board inside the CPU box) or external (a separate box).

For example, a PC in Los Angeles can send instructions to a PC in New York, if both share some common features and a have a modem and telephone line to connect them. The PC operator in Los Angeles has the phone number of the PC in New York. He dials the phone number in New York. Once he is connected, he engages his PC's modem. His modem then translates all the information the PC wants to send to New York into a series of audible beeps. The modem connected to the PC in New York translates the audible beeps into an electronic language the New York PC understands. When the operation is complete the information has been transferred through the simple means of a phone call. Figure 2-12 shows a typical PC modem linkage.

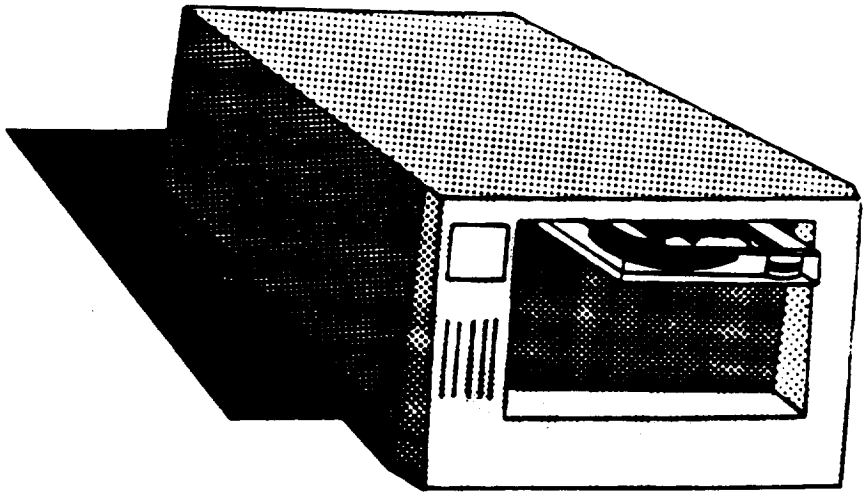
Figure 2-12. TYPICAL PC MODEM LINKAGE.



TAPE BACKUP UNIT

A tape backup unit (see Figure 2-13) is a device that can quickly make a complete copy of all the information that is stored on a PC's hard disk. It is similar to a high speed cassette recorder. Depending upon its rate of speed, it can make a copy of a 40 megabyte hard disk (approximately 150,000 pages of text) in about 10 minutes. In the event of disk failure, destruction of information, or inability to access information, the data from the tape backup can be restored to the disk. A tape backup is most effective when the procedure is done on a routine basis. For instance, at the end of each day, if the hard disk is backed up, it would be impossible to lose more than a full day's work. Tape backup devices become very important when PC's are networked.

Figure Intro. 2-13. COMMON TAPE BACKUP UNIT.



HARDWARE CONFIGURATIONS

IBM originally designed their PCs with open architecture. The result of this decision has led to an age of high compatibilty. Generally, this means that manufacturers can produce hardware that is compatible with the standards set by IBM PCs. As a result it is possible to mix and match a wide variety of hardware components to create the system that best suits your needs. For instance, it is quite possible to buy a CPU, monitor, printer, and tape backup from different manufacturers and bring them together into your own PC system. A PC system can be either a stand alone computer or part of a network.

STAND ALONE PC: A stand alone system consists of one PC that is not linked through wiring to any other computer. This system can still use a modem to communicate with other computers. However, stand alones preclude the sharing of instantaneous data between computers. (See Figure 2-14).

NETWORKED PC: A network is the electronic cabling (linking) of two or more PCs enabling them to share information and resources. This is often a good solution when people in the same office must work on similar projects or tasks. In a network situation most information is stored on a common hard disk ("fileserver" or "network server"). This allows every person in the network access to the same information simultaneously. In addition to sharing data stored on a central hard disk, they can share other expensive resources like a laser printer. Networks are normally maintained within one proximity. This is why they are also called Local Area Networks (LANS). Almost all LANS have some basic features in common: 1. They operate within a limited geographic area; 2. They physically interconnect a range of data processing and communication devices; 3. They interconnect devices in such a way that every device can communicate with every other device. (See Figure 2-15).

Figure 2-14. STAND ALONE PC.

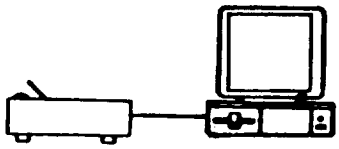
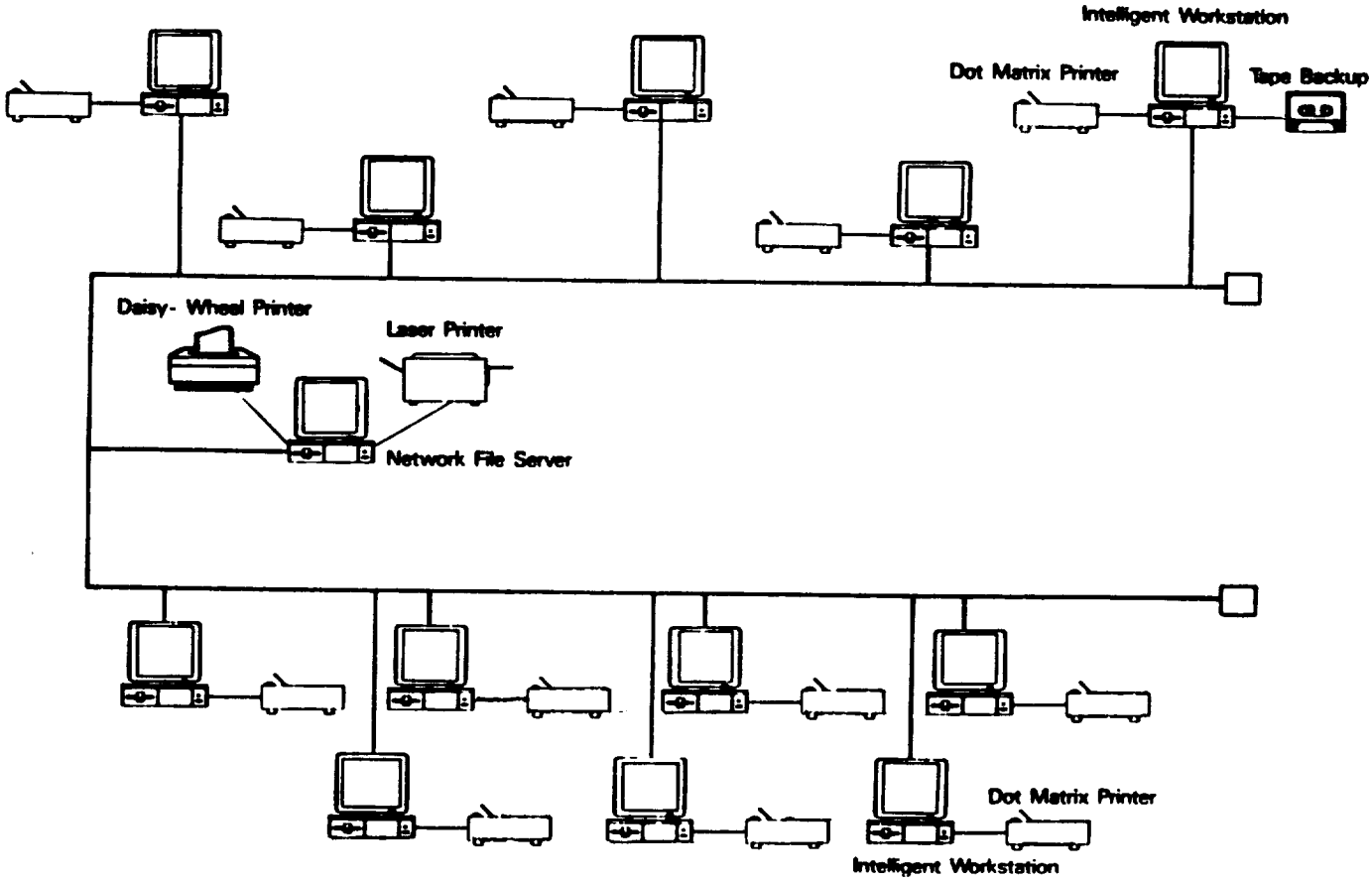


Figure 2-15. TYPICAL LAN CONFIGURATION FOR TUNS.



SOFTWARE

Software is the set of instructions or programs people design to control the activities of a computer. Without software a computer can do absolutely nothing. Unlike hardware, software cannot be touched. Typically it is code written by a computer programmer in a language that the computer understands. While you interact with the computer, it constantly refers to its software in order to know what to do next.

There are many different types of software. For a beginner it is important to learn the difference between an operating system program and an application program.

OPERATING SYSTEM

An operating system is one of the most complex types of programs. The operating system controls the flow of information to and from all the computer's resources. These resources are all the elements that make up the computer system, including the keyboard, the monitor, and the printer. The operating system also controls the use of the disk drives for storing and retrieving programs and data. The most popular operation system for IBM type PCs is called DOS. DOS stands for Disk Operating System.

APPLICATION PROGRAM

An application program is designed to help you accomplish certain tasks. It works in conjuction with the operating system, but its goals are more limited and specific. These are the programs you use most frequently.

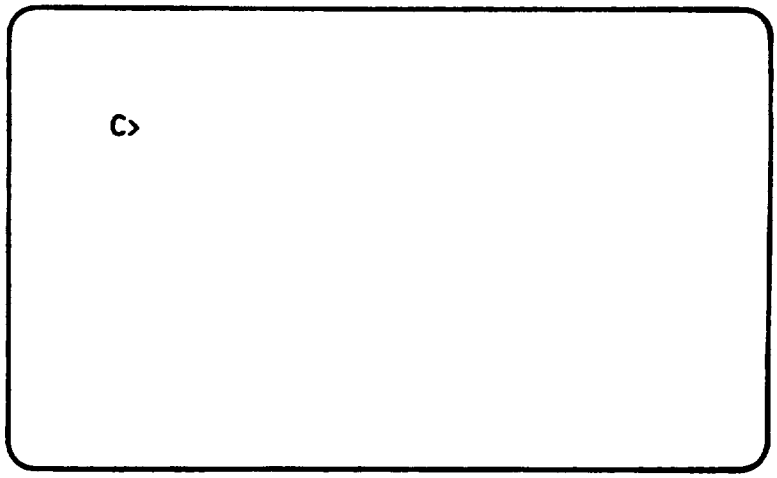
There are a variety of application programs that are can be purchased for your PC. These programs are referred to as off-the-shelf, since they can be purchased at a software store. The following are typical application programs:

1. WORD PROCESSING: Used to write, edit, and print written materials. Typical Programs: Word Perfect, Word Star, Samna.
2. SPREADSHEET: Used to create budget analysis, spreadsheets, and payrolls. Typical Programs: Lotus 1-2-3, SuperCalc, Twin.
3. DATABASE MANAGER: Used to organize and save information. Typical Programs: Unify, Dbase III, Rbase.
4. INTEGRATED PACKAGE: The combination of various applications, including those mentioned above, put into one program. TUNS is an integrated application program.

DOS

As previously mentioned, when you are outside of the TUNS software, you are in the Disk Operating System (DOS) environment. As the name suggests, DOS is the operating system which controls the resources of your computer including TUNS. Since DOS has the task of overseeing all the other software in the system, it is fairly difficult to master. Fortunately, you will not need to learn DOS in order to successfully operate TUNS. In this section of the manual, we simply highlight a few simple DOS commands which will allow you to copy your Office Automation files onto a floppy diskette.

When you turn your computer on, the computer will bring you straight to the DOS prompt. This is the DOS prompt you should look for:



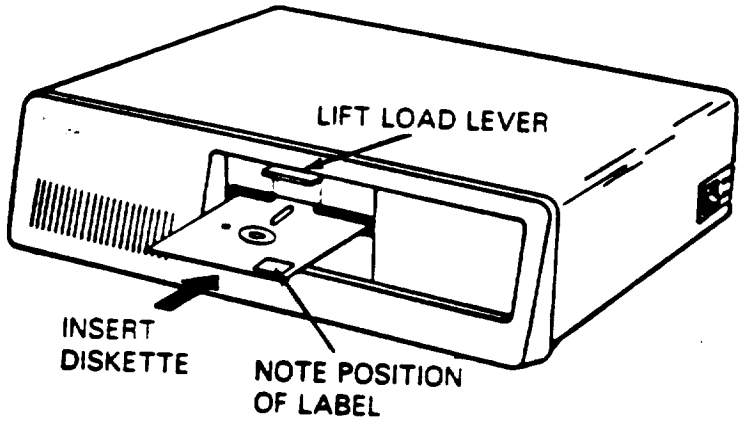
NOTE: **If you see something different, contact your system administrator.**

The DOS prompt is also called a command line because DOS is seeking a command from you. DOS has been designed to understand hundreds of commands to perform hundreds of different functions. The first command we will learn is the **format** command.

The format command prepares a floppy diskette so that it can be used with your computer system. Before a diskette is formatted it is just a blank magnetic medium. When you place a diskette in the floppy disk drive and format it, the computer is putting grooves or tracks on it. It will later use these tracks as locations where it can store information. Follow these steps:

Exercise 1: Formatting a Diskette

1. Place the diskette into the A floppy drive.



2. On the C> prompt command line type **Format A:** your screen should look like this.

```
C>Format A:
```

C > FORMAT

IF C IS THE DEFAULT DRIVE YOU WILL ERASE THE FIXED DISK WITH THIS COMMAND

3. DOS will then tell you:

```
Insert new diskette for drive A:
  and strike Enter when ready
```

4. Press return, and listen. The diskette is being formatted. The red indicator light for drive A will be on. The following message will appear.

```
Formatting...
```

5. After about 20 to 40 seconds, the following message will appear:

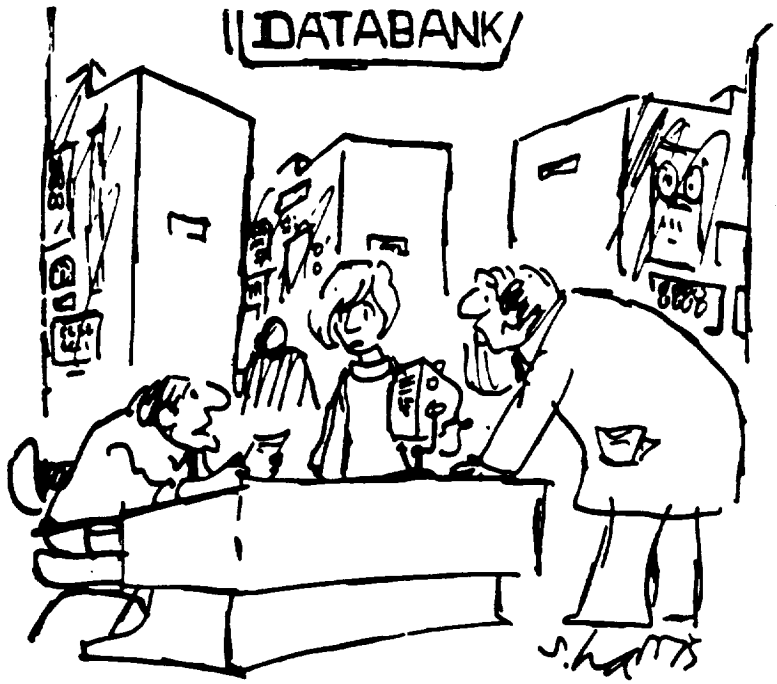
```
Formatting ... format complete
362496 bytes total disk space
362496 bytes available on disk

    Format another (Y/N) ?
```

6. Press N for no, and remove the disk.

7. Write "practice disk" on the diskette label, and place it on the diskette.

8. Place the diskette inside its sleeve.

NOTE: Any diskette can be formatted, including diskettes previously formatted. When a previously used diskette is formatted, all the information on the diskette is erased. Therefore, be careful. Formatting is an excellent way to erase diskettes you no longer want, but it is also a an easy way to accidently lose files you had intended to keep. Unless you are absolutely certain you know what you are doing, you should never format drive C:. When you format drive C:, you will erase the entire hard disk, including the operating system!

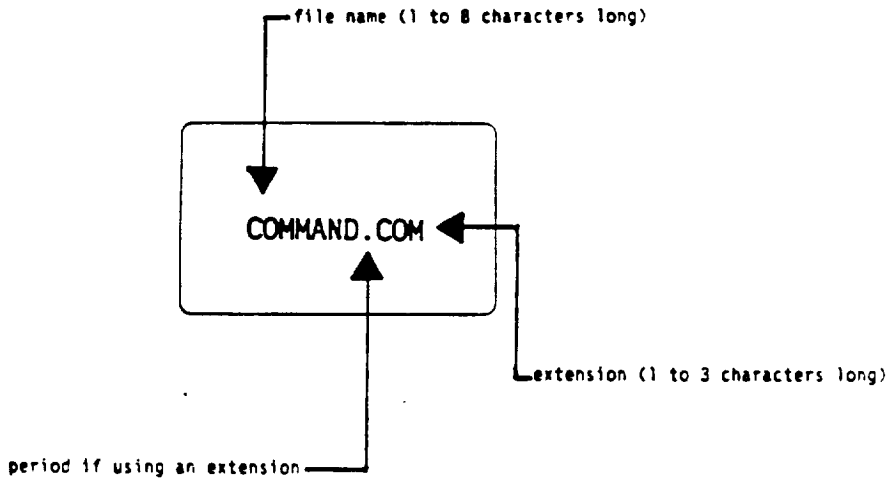


BY SIDNEY HARRIS FROM HIS BOOK "WHAT'S SO FUNNY ABOUT COMPUTERS"

"Now don't panic. Not *everything* was erased. We still have loads of data on rainfall, upholstery and jaywalking."

DOS COMMANDS: DIRECTORY

A file is related information stored by DOS under a single name. A file can be a letter, a large document, a small paragraph, or even a set of software instructions. Files must have specific names so that DOS can locate them. The following is a typical file name:



The file name is COMMAND. The file name can be one to eight characters long. COM is the file's extension, which can be one to three characters long. All files must have root names; extensions are optional. When you use extensions, you seperate the root name from the extension with a period.

To operate TUNS, you will not need to learn file naming conventions. File naming information has been provided so that you can identify your files, when you issue the Directory command.

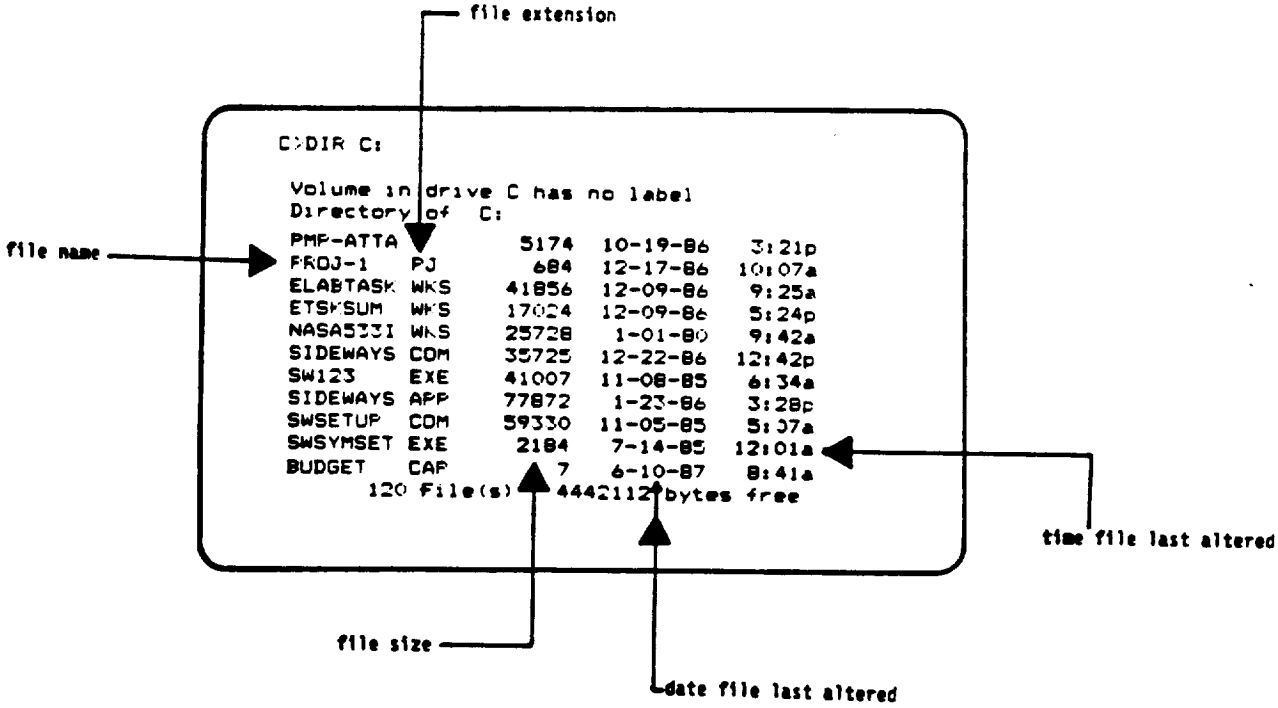
DIR:

The DIR command allows you to get a list of all the files on either a diskette or the hard disk. DIR is an abbreviation for directory, the area of the disk where the list is kept. Follow these steps.

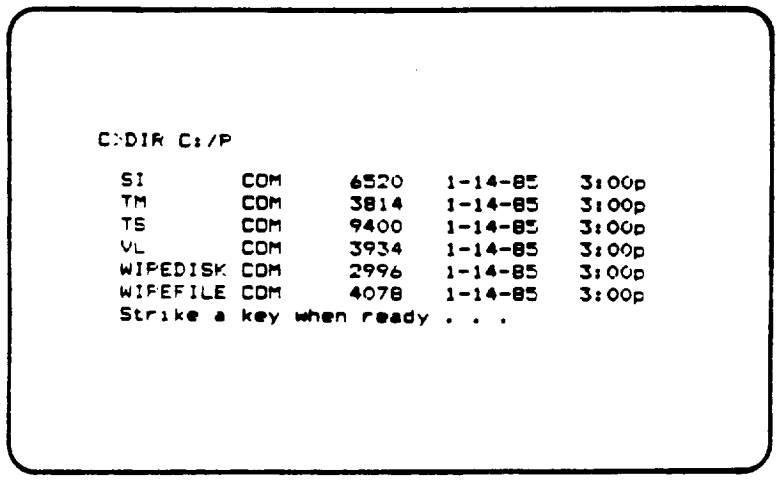
Exercise 2: Getting a List of Files

1. On the C> prompt command line type **DIR C:** and press return.

You have requested a directory of all the files on the C: drive. When the command has been entered, your screen should immediately fill with text and start to scroll up. When it stops, it should look something like this:



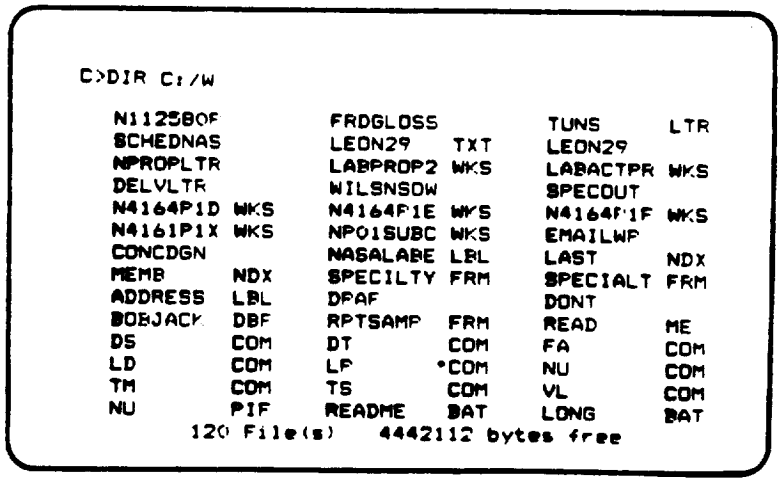
2. To freeze the list of files one screen at a time, so that you can view them, type **Dir C: /P** and press return. P stands for pause. This time your screen should look something like this:



```
C>DIR C:/P

 SI          COM      6520    1-14-85    3:00p
 TM          COM      3814    1-14-85    3:00p
 TS          COM      9400    1-14-85    3:00p
 VL          COM      3934    1-14-85    3:00p
 WIPEDISK    COM      2996    1-14-85    3:00p
 WIPEFILE    COM      4078    1-14-85    3:00p
 Strike a key when ready . . .
```

3. Press any key to receive the next screen of files.

4. To have your files print out across the screen horizontally, type **Dir C: /W.** W stands for wide. Your screen should now look something like this:

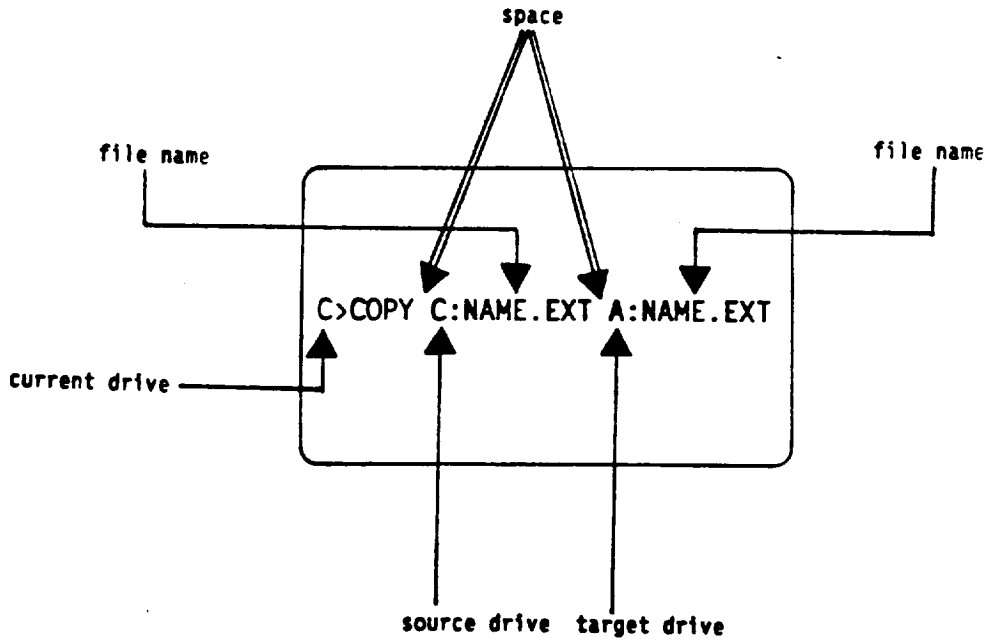


```
C>DIR C:/W

 N1125BOF          FRDGLOSS          TUNS       LTR
 SCHEDNAS          LEON29    TXT     LEON29
 NPROPLTR          LABPROP2  WKS     LABACTPR   WKS
 DELVLTR           WILSNSDW          SPECOUT
 N4164P1D  WKS     N4164P1E  WKS     N4164P1F   WKS
 N4161P1X  WKS     NP01SUBC  WKS     EMAILWP
 CONCDGN           NASALABE  LBL     LAST       NDX
 MEMB      NDX     SPECILTY  FRM     SPECIALT   FRM
 ADDRESS   LBL     DPAF              DONT
 BOBJACK   DBF     RPTSAMP   FRM     READ       ME
 DS        COM     DT        COM     FA         COM
 LD        COM     LP        *COM    NU         COM
 TM        COM     TS        COM     VL         COM
 NU        PIF     README    BAT     LONG       BAT
        120 File(s)    4442112 bytes free
```

DOS COMMANDS: COPY

For purposes of privacy, storage, or transportability, the copy command will allow you to duplicate letters, spreadsheets, and other files that are created through the Office Automation menu. The key to performing the copy function is to make sure the syntax of the command is correct. You will have to first identify the source drive, which is the drive where the file you want to copy is located. You must then indicate the target drive, which is the drive where you want the file to be copied. In addition, you must identify the file by its exact file name, including the extension.

To copy a file from the hard disk to the floppy diskette issue this command:



To copy files from the floppy diskette onto the hard disk simply reverse the target and source drives. Issue this command:

```
C>COPY A:NAME.EXT C:NAME.EXT
```

Exercise 3: Copying Files

1. Issue a DIR command at the C> prompt to get a list of files. Refer to exercise 2, for reference.
2. Pick a file from the list, and copy it onto a formatted floppy diskette. Refer to exercise 1, for a refresher on formatting diskettes.
3. Issue a DIR command to check the files on the floppy diskette. It is the same command you used to get a list of files of the hard disk, only instead of typing **DIR C:**, type **DIR A:**. Once this command is issued, you should now see the file you copied from the hard disk listed on your screen.

IN SUMMARY:

1. The world of computers is filled with jargon that can intimidate the beginner. Dont' let the language get to you! You will not need to learn a new language in order to operate your computer effectively.

2. Don't be afraid of the keyboard. It is virtually impossible to do any harm to a computer by pressing the keys on a keyboard.

3. Although personal computers come in many different shapes and sizes, almost all of them operate the same way. Learn one, and you learn them all.

4. You will not need to learn how the computer operates in order to use it effectively. For example, do you know how your car engine works? Probably not, but you still manage to drive without problems.